

REMARKS

Claims 13, 14, and 16-26 are pending and under current examination. For the reasons presented herein, Applicants traverse the rejections set forth in the Final Office Action¹, which:

(a) rejected claims 13, 14, and 16-20 under 35 U.S.C. § 103(a) as being unpatentable over WO 00/00868 ("Chou") in view of Mattox, *Handbook of Deposition Technologies*..., Chapter 3 ("Mattox") and Jaszewski et al., *Microelectronic Engineering* 35 (1997) 381-384 ("Jaszewski");

(b) rejected claims 21, 22, and 25 under 35 U.S.C. § 103(a) as being unpatentable over Chou; and

(c) rejected claims 23, 24, and 26 under 35 U.S.C. § 103(a) as being unpatentable over Chou in view of U.S. Patent No. 6,380,101 ("Breen").

Rejection of Claims 13, 14, and 16-20 under 35 U.S.C. § 103(a):

Applicants request reconsideration and withdrawal of the rejection of claims 13, 14, and 16-20 under 35 U.S.C. § 103(a) as being unpatentable over Chou in view of Mattox and Jaszewski.

The Final Office Action has not properly resolved the *Graham* factual inquiries, the proper resolution of which is the requirement for establishing a framework for an objective obviousness analysis. See M.P.E.P. § 2141(II), citing to *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), as reiterated by the U.S. Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, 82 USPQ2d 1385 (2007).

In particular, the Final Office Action has not properly determined the scope and content of the prior art. Specifically, Chou in view of Mattox and Jaszewski do not teach or suggest what the Final Office Action attributes to them. In addition, the Final Office Action has not

¹ The Office Action contains statements characterizing the related art and the claims. Regardless of whether any such statements are specifically identified herein, Applicants decline to automatically subscribe to any statements in the Office Action.

properly ascertained the differences between the claimed invention and the prior art, at least because it has not interpreted the prior art and considered both the invention and the prior art as a whole. See M.P.E.P. § 2141(II)(B).

Chou in view of Mattox and Jaszewski, whether taken alone or in combination, do not teach or suggest at least Applicants' claimed "oxidising the layer of metal to form a mechanically stable oxide film, and applying at least one reagent on the oxide film, said reagent comprising molecule chains, each having a linkage group, which is chemically bonded with the oxide film..." (claim 13) (emphases added).

As recited in claim 13, the "at least one reagent" comprises "molecule chains, each having a linkage group. The "linkage group" "is chemically bonded with the oxide film," the oxide film being formed by "oxidising the layer of metal to form a mechanically stable oxide film" (emphases added). Chou, however, does not disclose or suggest the claimed oxidizing step of the metal layer in order to make it more chemically and mechanically stable before applying the non-adhesive layer. In fact, according to the Final Office Action, Chou "fails to specifically teach the process of applying the metal layer, oxidizing the layer of metal to form an oxide film and then applying the reagent on the oxide film." Final Office Action, p. 4.

While many organic molecules may form chemical bonds with metal oxides, in the case of Applicants' claims, however, the claimed mechanical stability of the oxide film provides for a strong connection between the claimed reagents and the claimed stamp blank. Applicants note that the reagents would not react chemically with a pure non-oxidised metal. None of the secondary references thus address or resolve the deficiencies of Chou.

For example, Mattox teaches that oxides on the surface are to be avoided, since they are considered contaminants. According to Mattox, the "contaminant is any material on a surface

that interferes with the processing or performance of the surface. Contaminants may be reacted layers such as oxides, absorbed layers such as hydrocarbons, segregated surface layers or particulates. The contaminant may originate from (i) natural reaction with the ambient (oxides, sulphides) ... Some of this recontamination unavoidable but some is avoidable with proper fabrication, handling and storage techniques.” Mattox, p. 84.

In contrast to Mattox, however, in the case of Applicants’ claims, the oxidised metal layer does not “interfere” with the processing or performance of the surface, rather, the layer of metal film is specifically oxidised “to form a mechanically stable oxide film” to which “at least one reagent ... having a linkage group ... is chemically bonded with the oxide film” (claim 13). Thus, the claimed “stamp blank with a structure pattern on its surface” may be used as part of the claimed “mold tool” when the mold tool is exposed to mechanical forces during nano scale imprint processes in which the mold tool should be mechanically stable to imprint nano scale features.

Even though oxidization of a surface material is mentioned in Mattox, Applicants note that it is performed in order to avoid contamination of the surface and not to achieve mechanical stability for a nano scale imprint process. According to Mattox, “...cleaning steps are designed to remove specific types of contaminants such as particulates and organics, by solvents saponifiers, emulsifiers and oxidation techniques....” Mattox, p. 93. Moreover, Mattox refers to oxidation cleaning of contaminants as “Oxidation Cleaning: Oxidation cleaning relies on the formation of volatile or soluble oxidation products.” Mattox, p. 102. Further Mattox teaches that “[t]he use of oxidation by ultraviolet radiation, which generates ozone and causes bond scission of hydrocarbon contaminates (UV/O₃ cleaning) has greatly simplified the production, storage and maintenance of hydrocarbon-free surfaces.” Mattox, p. 103. Hence, the thickness of

the claimed layer of metal or oxidised layer of metal is not relevant for the oxidizing method in Mattox. Thus, Mattox describes deposition technologies in general, and is not directed to the scale-specific problems encountered in nano-imprint technology.

Since Chou is silent regarding the claimed oxidizing step and does discuss how or importantly why such a step should be performed, and since Mattox teaches oxidation solely in order to prevent contamination, on of ordinary skill in the art at the time of the invention would not have turned to Mattox in an attempt to cure the deficiencies of Chou. person would have no reason to turn to Mattox.

In addition, as discussed in Applicants' specification and in the Amendment filed on May 27, 2008, Jaszewski is directed to investigating the degradation of anti-adhesive properties of protective PTFE films during the hot embossing of thermoplasts. See Jaszewski, Abstract. In particular, the Final Office Action again cited section 2.1, entitled "Polytetrafluoroethylene (PTFE) films," for an alleged teaching of "different applications [] such as sputtering or plasma polymeriz[ation] of the films onto a metal surface." Final Office Action, p. 4. This too does not even remotely teach or suggest at least the above-quoted elements of claim 13. Instead, Jaszewski teaches that PTFE films were deposited on shims with random implantation of fluorinated ions on a nickel surface. See Jaszewski, p. 381, col. 2. That is, the PTFE-like film in Jaszewski, which is prepared by plasma polymerisation or ion sputtering, is not stable enough to withstand a high number of performed imprints. Actually, the film in Jaszewski was degraded after only 50 imprints due to diffusion of fluorine from the film to the embossed material. See Jaszewski, Section 4 (Conclusions), p. 384. The reason for this behavior is that Jaszewski's film is not specifically oxidised "to form a mechanically stable oxide film" to which "at least one

reagent ... having a linkage group ... is chemically bonded with the oxide film,” as recited in claim 13.

Finally, the Final Office Action again cited Breen² in relation to the dependent claims, to allege that “[i]t is known in the art that the metal oxide layer can be as thin as 50 to 1000 nm.” Final Office Action, p. 4. Regardless of whether or not a metal film can be as thin as 50 to 1000 nm, Breen, like the other cited references, also does not even remotely teach or suggest at least the above-quoted elements of claim 13. *See also* Amendment filed on May 27, 2008, p. 14. Instead, Breen teaches microcontact printing of self-assembled monolayers (SAMs) on indium zinc oxide (IZO) films to protect the underlying IZO films from wet chemical etching. *See Breen*, Abstract. In Breen’s microcontact printing, the elastomer (PDMS) stamp is inked with a solution of SAMs and then brought into conformal contact with an IZO surface. Only where the raised surfaces of the elastomeric stamp contact the IZO surface are the SAMs transferred. When the stamp is removed and the IZO surface is wet-etched, only IZO regions covered with SAMs are protected against etching. Moreover, in Breen, the SAMs stick to the substrate and not to the elastomer stamp, which is not covered by a metal oxide. Therefore, Applicants’ claimed chemically bonded reagent with the oxide film will not be obtained with the elastomer stamp of Breen, and is not desired because it is the function of the elastomer stamp to transfer the SAMs to the surface where they chemically react with IZO films. This clearly does not constitute a teaching or suggestion of Applicants’ claim 13, and does not cure the deficiencies of any combination of Chou, Mattox, and Jaszewski.

In view of the reasoning presented above, Applicants submit that independent claim 13 is not obvious over Chou in view of Mattox, Jaszewski, or Breen, whether taken alone or in any

² Cited in the body of this rejection only, as a “background reference.”

combination, at least because the Final Office Action has neither properly determined the scope and content of the prior art, nor properly ascertained the differences between the prior art and the claimed invention. Independent claim 13 should therefore be allowable. Dependent claims 14 and 16-20 should also be allowable, at least by virtue of their dependence from base claim 13. Accordingly, Applicants request withdrawal of the 35 U.S.C. § 103(a) rejection.

Remaining 35 U.S.C. § 103(a) Rejections of claims 21-26:

Applicants request reconsideration and withdrawal of the remaining rejections of claims 21-26 under 35 U.S.C. § 103(a) as being unpatentable over Chou and Breen, taken alone or in combination.

For the reasons discussed in the previous section, Chou, taken alone or in combination with any of the other cited references, does not render obvious Applicants' independent claim 13. Independent claim 21, while of different scope, contains recitations similar to those in claim 13 and therefore Chou and Breen, taken alone or in combination, do not render obvious independent claim 21, or claims 22 and 25, which depend from claim 21.

The Final Office Action applied Chou against dependent claims 21-26, and Breen in combination with Chou against dependent claims 23, 24, and 26, though Applicants note that this still does not cure the deficiencies of Chou as applied to independent claims 13 and 21, or claims 21-26, which depend from claim 21.

For at least the above reasons, Applicants' dependent claims 21-26 are nonobvious over Chou and Breen, taken alone or in combination, at least due to their dependence from base claim 21. These claims should therefore be allowable. Applicants therefore respectfully request withdrawal of the remaining 35 U.S.C. § 103(a) rejections.

Conclusion:

Applicants request reconsideration of the application and withdrawal of the rejections. Pending claims 13, 14, and 16-26 are in condition for allowance, and Applicants request a favorable action.

If there are any remaining issues or misunderstandings, Applicants request the Examiner telephone the undersigned representative to discuss them.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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